

**THE CHINESE UNIVERSITY OF HONG KONG**  
**Department of Information Engineering**

**Suggested Study Plan for SYSU2+2 Students**  
**(2017-18)**

**For students entering into senior year places, the minimum unit requirement is 69.**

University core requirements:

|                   |   |
|-------------------|---|
| English (9 units) | Exempt 4 units. Students will be required to take Year 2 (3-unit) and Year 3 (2 unit) English courses |
| Chinese (6 units) | Exempt 6 units  |
| UGE (15 units)    | Exempt 9 units. Students will be required to take one 3-unit GE foundation course and one UGEA course |
| CGE (6 units)     | Exempt 3-4 units, depending on college affiliation  |
| IT (1 unit)       | Exempt 1 unit   |
| PE (2 units)      | Exempt 1 unit   |

Total unit exemption: 24/25 for SYSU2+2 students

**Major Programme Requirement for SYSU2+2 Students**

Students are required to complete a minimum of 52 units of courses as follows:

|  | Units |
|--|-------|
| 1. Faculty Package:<br>ENGG2601, 2602  | 3     |
| 2. Foundation Mathematics Courses:<br>ENGG1410/ESTR1004, ENGG2420/ESTR2000,<br>ENGG2470/ESTR2012   | 9     |
| 3. Required Courses:   |       |
| (a) CSCI1140, CSCI2100/ESTR2102, ENGG2310/ESTR2300,<br>IERG2051/ESTR2302, IERG3060, 3080, 3310, 3800, 3810, 3820   | 22    |
| (b) Research Component Courses[a]:<br>IERG4998/ESTR4998, IERG4999/ESTR4999   | 6     |
| 4. Elective Courses[b]:  | 12    |
| Out of 12 Elective Course units, at least 9 units should be from the following major courses:<br>CSCI3150/ESTR3102, ENGG1820, ENGG4030/ESTR4300,<br>IERG3010/ESTR3300, IERG3050, IERG3280/ESTR3302,<br>IERG3300/ESTR3304, IERG3320/ESTR3306, IERG3830, IERG4030,<br>IERG4080/ESTR4312, IERG4090/ESTR4302, IERG4100/ESTR4304,<br>IERG4110/ESTR4314, IERG4130/ESTR4306, IERG4160,<br>IERG4180/ESTR4308, IERG4190, 4210, 4220, 4230,<br>IERG4330/ESTR4316, IERG4831, 4841, 5020,<br>IERG5040/ENGG5392, IERG5090, IERG5100/ENGG5303,<br>IERG5130, 5140, IERG5154/ENGG5301, IERG5200,<br>IERG5240/ENGG5383, IERG5270, 5280, 5290, |       |

IERG5300/ENGG5302, IERG5310, 5320, 5330

The remaining units, if any, can be fulfilled by any BMEG/CENG/CSCI/ELEG/ENER/ENGG/ESTR/MAEG/SEEM course(s) at 3000 and above level.

### **Streams**

Students may choose not to specialize in any stream or to specialize in one or more of the five streams and complete a minimum of 12 units of courses prescribed by the stream.

### **Big Data: Systems and Applications**

CSCI3320, 4180, 4190, ELEG5491, ENGG4030/ESTR4300 (required), IERG3320/ESTR3306, IERG4080/ESTR4312, IERG4160, 4230, IERG4330/ESTR4316

### **Communications**

IERG3010/ESTR3300, IERG3280/ESTR3302, IERG3300/ESTR3304, IERG4030, IERG4100/ESTR4304, IERG4110/ESTR4314, IERG4130/ESTR4306, IERG4230, 5020, IERG5040/ENGG5392, IERG5100/ENGG5303, IERG5200, 5280, 5330

### **Cyber Security**

CSCI3150/ESTR3102, IERG4130/ESTR4306 (required), IERG4210, 4220, IERG5240/ENGG5383, IERG5310, 5320

### **Internet Engineering**

CSCI3150/ESTR3102 (required), IERG3050, IERG3280/ESTR3302, IERG3300/ESTR3304, IERG4080/ESTR4312, IERG4090/ESTR4302, IERG4130/ESTR4306, IERG4180/ESTR4308, IERG4190, 4210, 4831, 4841, 5090, 5270, 5280

### **Enrichment**

CSCI3160/ESTR3104, ENGG4030/ESTR4300, IERG3010/ESTR3300, IERG3050, IERG3280/ESTR3302, IERG3300/ESTR3304, IERG4100/ESTR4304, IERG4190, IERG5154/ENGG5301, IERG5200, 5270, 5290, IERG5300/ENGG5302

**Total:** 

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 **52**

In addition to fulfilling the above Major Programme Requirement, students may also challenge themselves by taking the following stream offered by the Faculty:

### **Engineering Leadership, Innovation, Technology and Entrepreneurship (ELITE) Stream[c]**

Elective Courses:

15 units of courses[d]:

- i) 12 units of ESTR courses of which at most 6 units of courses at 1000 or 2000 level and at least 6 units of courses at 3000 or 4000 level
- ii) 3 units of BMEG/CENG/CSCI/ELEG/ENGG/IERG/MAEG/SEEM courses at 5000 level

Explanatory Notes:

1. BMEG/CENG/CSCI/ELEG/ENER/ENGG/ESTR/IERG/MAEG/SEEM required and major elective courses at 2000 and above level will be included in the calculation of

Major GPA for honours classification, excluding courses in Faculty Package, Foundation Science courses as specified by the Programme and Foundation Mathematics courses.

2. Students satisfying all the requirements of a stream (except the ELITE Stream, which will be officially recorded in the academic transcript) will be given a certifying letter upon request. For details, please refer to the Department for information.
  - [a] Students who have declared to specialize in the ELITE Stream will be required to complete 6 units of ESTR4998 and 4999 to substitute for IERG4998 and 4999.
  - [b] Details of the entrance and coursework requirements, and declaration procedures for the ELITE Stream can be found at the ELITE website ([www.erg.cuhk.edu.hk/elite](http://www.erg.cuhk.edu.hk/elite)). Non-ELITE Engineering students may be allowed to take ESTR courses. Students are required to seek approval from their respective Major Programmes for using ESTR courses taken to fulfill the Major Programme Requirement. Details are available at the ELITE website.
  - [c] Students can use up to 9 units of courses which have been taken to fulfill the requirements of items 1 to 4 above (excluding item 3(b) Research Component Courses) to fulfill the elective requirements of the ELITE Stream. A full list of ESTR courses is available at the ELITE website.
  - [d] Students can use BMEG/CENG/CSCI/ELEG/ENGG/IERG/MAEG/SEEM courses at 5000 level to substitute for ESTR courses at 3000 or 4000 level, subject to the approval of the Stream Director and the Associate Dean (Education).
  - [e] The requirement of at least 3 units of Engineering courses at 5000 level is a requirement for the ELITE Stream only. It should not be interpreted as a requirement of the Major Programme.

### Suggested study plan:

#### First Year

*1<sup>st</sup> semester*

*2<sup>nd</sup> semester*

| Code                               | Course  |              |  | Code                               | Course  |           |
|------------------------------------|---|--------------|--|------------------------------------|---|-----------|
| <b>ENGG2420 /<br/>ESTR2000 [a]</b> | Complex Analysis and<br>Differential Equations for<br>Engineers | 3            |  | <b>ENGG1410 /<br/>ESTR1004 [a]</b> | Linear Algebra and Vector<br>Calculus for Engineers | 3         |
| <b>CSCI1140 [a]</b>                | Programming Laboratory  | 1            |  | <b>ENGG2470 /<br/>ESTR2012 [a]</b> | Probability for Engineers                           | 3         |
| <b>IERG3310</b>                    | Computer Networks   | 3            |  | <b>ENGG2601</b>                    | Technology, Society and<br>Engineering Practice     | 2         |
| <b>ENGG2310 /<br/>ESTR2300</b>     | Principles of<br>Communication Systems                          | 3            |  | <b>ENGG2602</b>                    | Engineering Practicum                               | 1         |
| <b>IERG3820</b>                    | Communications Lab  | 1            |  | <b>CSCI2100 /<br/>ESTR2102 [a]</b> | Data Structures                                     | 3         |
| <b>UGFH1000 /<br/>UGFN1000</b>     | University General<br>Education Foundation<br>Course            | 3            |  | <b>IERG2051 /<br/>ESTR2302 [a]</b> | Signals and Systems                                 | 3         |
|                                    | Physical Education  | 1            |  | <b>ELTU2014</b>                    | English for Engineering I                           | 3         |
|                                    | University (UGEA) or<br>College General<br>Education Course     | 2-3          |  |                                    |   |           |
|                                    |   |              |  |                                    |   |           |
|                                    |   | <b>17-18</b> |  |                                    |   | <b>18</b> |

## Second Year

3<sup>rd</sup> semester

4<sup>th</sup> semester

| Code                       | Course  |              |  | Code                       | Course   |           |
|----------------------------|---|--------------|--|----------------------------|--|-----------|
| <b>IERG4998 / ESTR4998</b> | Final Year Project I                                  | 3            |  | <b>IERG4999 / ESTR4999</b> | Final Year Project II                            | 3         |
| <b>IERG3080</b>            | Information and Software Engineering Practice         | 3            |  | <b>IERG3060</b>            | Microcontrollers and Embedded Systems            | 3         |
| <b>IERG3800 [b]</b>        | Information Infrastructure Design Lab                 | 1            |  | <b>IERG3810</b>            | Microcontrollers and Embedded Systems Laboratory | 1         |
|                            | Major Elective  | 3            |  |                            | Major Elective                                   | 3         |
|                            | Major Elective  | 3            |  |                            | Major Elective                                   | 3         |
|                            | University (UGEA) or College General Education Course | 2-3          |  | <b>ELTU3014</b>            | English for Engineering II                       | 2         |
|                            |   |              |  |                            | Free Elective                                    | 3         |
|                            |   |              |  |                            |  |           |
|                            |   | <b>15-16</b> |  |                            |  | <b>18</b> |

|                                      | Number of Units |   |
|--------------------------------------|-----------------|---|
| <b>Major Required Courses</b>        | <b>40</b>       |   |
| <b>Major Electives</b>               | <b>12</b>       |   |
| College General Education Courses    | 2/3             | Depending on the affiliating college                          |
| University General Education Courses | 6               | (one general education foundation course and one UGEA course) |
| English Language Courses             | 5               |   |
| Physical Education Course            | 1               |   |
| Free Electives                       | 3               |   |
| <b>Total</b>                         | <b>69/70</b>    |   |

Explanatory note:

[a] Students in the CUHK SYSU 2+2 program are strongly advised to apply for exemption of ENGG1410, 2420, 2470, CSCI1140, 2100, and IERG2051. When exemption from a particular course is recognized, students can only be exempted from the course but not the units. Students are required to substitute the exempted courses by major elective courses. They can also use any BMEG /CENG /CSCI /ELEC /SEEM /MAEG /ENER /ENGG /ESTR 3000 or above courses for such substitution.

[b] IERG3800 can also be taken in the summer term of the first year.

*Last update: July 2017*

## Course List

| <i>Course Code</i> | <i>Course Title</i>  | <i>Unit(s)</i> |
|--------------------|--|----------------|
| CHEM1380           | Basic Chemistry for Engineers                                    | 3              |
| CSCI1120/ESTR1100  | Introduction to Computing Using C++                              | 3              |
| CSCI1130/ESTR1102  | Introduction to Computing Using Java                             | 3              |
| CSCI1140           | Programming Laboratory   | 1              |
| CSCI2100/ESTR2102  | Data Structures  | 3              |
| CSCI3150/ESTR3102  | Introduction to Operating Systems                                | 3              |
| CSCI3160/ESTR3104  | Design and Analysis of Algorithms                                | 3              |
| CSCI3320           | Fundamentals of Machine Learning                                 | 3              |
| CSCI4180           | Introduction to Cloud Computing and Storage                      | 3              |
| CSCI4190           | Introduction to Social Networks                                  | 3              |
| ELEG5491           | Introduction to Deep Learning                                    | 3              |
| ELTU2014           | English for Engineering I  | 3              |
| ELTU3014           | English for Engineering II                                       | 2              |
| ENGG1100/ESTR1000  | Introduction to Engineering Design                               | 3              |
| ENGG1110/ESTR1002  | Problem Solving by Programming                                   | 3              |
| ENGG1310/ESTR1003  | Engineering Physics: Electromagnetics, Optics and Modern Physics | 3              |
| ENGG1410/ESTR1004  | Linear Algebra and Vector Calculus for Engineers                 | 3              |
| ENGG1820           | Engineering Internship   | 1              |
| ENGG2310/ESTR2300  | Principles of Communication Systems                              | 3              |
| ENGG2420/ESTR2000  | Complex Analysis and Differential Equations for Engineers        | 3              |
| ENGG2470/ESTR2012  | Probability for Engineers  | 3              |
| ENGG2601           | Technology, Society and Engineering Practice                     | 2              |
| ENGG2602           | Engineering Practicum  | 1              |
| ENGG4030/ESTR4300  | Web-scale Information Analytics                                  | 3              |
| ENGG5301           | Information Theory   | 3              |
| ENGG5302           | Random Processes   | 3              |
| ENGG5303           | Advanced Wireless Communications                                 | 3              |
| ENGG5383           | Applied Cryptography   | 3              |
| ENGG5392           | Lightwave System Technologies                                    | 3              |
| IERG1810           | Electronic Circuit Design Laboratory                             | 1              |
| IERG2051/ESTR2302  | Signals and Systems  | 3              |
| IERG2060           | Basic Analog and Digital Circuits                                | 3              |
| IERG2602           | Engineering Practicum  | 1              |
| IERG3010/ESTR3300  | Digital Communications   | 3              |
| IERG3050           | Simulation and Statistical Analysis                              | 3              |
| IERG3060           | Microcontrollers and Embedded Systems                            | 3              |
| IERG3080           | Information and Software Engineering Practice                    | 3              |
| IERG3280/ESTR3302  | Networks: Technology, Economics, and Social Interactions         | 3              |
| IERG3300/ESTR3304  | Introduction to Stochastic Processes                             | 3              |
| IERG3310           | Computer Networks  | 3              |
| IERG3320/ESTR3306  | Social Media and Human Information Interaction                   | 3              |
| IERG3800           | Information Infrastructure Design Lab                            | 1              |
| IERG3810           | Microcontrollers and Embedded System Laboratory                  | 1              |
| IERG3820           | Communications Laboratory  | 1              |
| IERG3830           | Product Design Project   | 3              |

| <i>Course Code</i>    | <i>Course Title</i>  | <i>Unit(s)</i> |
|-----------------------|--|----------------|
| IERG4030              | Optical Communications   | 3              |
| IERG4080/ESTR4312     | Building Scalable Internet-based Services                          | 3              |
| IERG4090/ESTR4302     | Networking Protocols and Systems                                   | 3              |
| IERG4100/ESTR4304     | Wireless Communication Systems                                     | 3              |
| IERG4110/ESTR4314     | Hands-on Wireless Communication                                    | 3              |
| IERG4130/ESTR4306     | Introduction to Cyber Security                                     | 3              |
| IERG4160              | Image and Video Processing   | 3              |
| IERG4180/ESTR4308     | Network Software Design and Programming                            | 3              |
| IERG4190              | Multimedia Coding and Processing                                   | 3              |
| IERG4210              | Web Programming and Security                                       | 3              |
| IERG4220              | Secure Software Engineering  | 3              |
| IERG4230              | Introduction to Internet of Things                                 | 3              |
| IERG4330/ESTR4316     | Programming Big Data Systems                                       | 3              |
| IERG4831              | Networking Laboratory I  | 2              |
| IERG4841              | Networking Laboratory II   | 2              |
| IERG4998/ESTR4998     | Final Year Project I   | 3              |
| IERG4999/ESTR4999     | Final Year Project II  | 3              |
| IERG5020              | Telecommunication Switching and Network Systems                    | 3              |
| IERG5040              | Lightwave System Technologies                                      | 3              |
| IERG5090              | Advanced Networking Protocols and Systems                          | 3              |
| IERG5100              | Advanced Wireless Communications                                   | 3              |
| IERG5130              | Probabilistic Models and Inference Algorithms for Machine Learning | 3              |
| IERG5140              | Lightwave Networks   | 3              |
| IERG5154              | Information Theory   | 3              |
| IERG5200              | Channel Coding and Modulation                                      | 3              |
| IERG5240              | Applied Cryptography   | 3              |
| IERG5270              | Advanced Topics in P2P Networks and Systems                        | 3              |
| IERG5280              | Mobile Networking  | 3              |
| IERG5290              | Network Coding Theory  | 3              |
| IERG5300              | Random Processes   | 3              |
| IERG5310              | Security and Privacy in Cyber Systems                              | 3              |
| IERG5320              | Digital Forensics  | 3              |
| IERG5330              | Network Economics  | 3              |
| LSCI1001              | Basic Concepts in Biological Sciences                              | 3              |
| LSCI1003              | Life Sciences for Engineers  | 3              |
| MATH1020              | General Mathematics  | 3              |
| MATH1510              | Calculus for Engineers   | 3              |
| PHYS1003              | General Physics for Engineers                                      | 3              |
| PHYS1110              | Engineering Physics: Mechanics and Thermodynamics                  | 3              |
| UGFH1000/<br>UGFN1000 | University General Education Foundation Course                     | 3              |